**Title:** Sunset in a Beaker

**Ministry Expectations:** This demo can be used with the following expectations:

* Rates of Reactions (expectation D3.5 and D3.7 in SCH4U)
* Spectrum of visible light (used in many classes but covered specifically by expectation E3.2 of SNC2D)
* Properties of matter/mixtures (expectation C2.1 of SNC1D)

**Background and Introduction**

In this demo, a reaction is set up in a beaker which is placed on an overhead projector. As the reaction proceeds, the white light that passes though the liquid gradually changes color from yellow to orange to red to completely black, simulating the colors seen in a sunset. This is in contrast to the color when looking directly at the liquid in the beaker which starts out clear but changes to a cloudy, white color.

**Materials Needed**

0.5M Na2S2O3 1.0M HCl dH2O overhead projector

**Safety**

Wear goggles and handle the reagents with care. Products will be acidic and can be washed down the drain with excess water.

**Procedure**

1) Find a piece of paper/cloth that is large enough to cover the projector and cut a hole in it just large enough to fit a 500mL beaker.

2) Add 50mL Na2S2O3 to the beaker and fill up to 500mL with dH2O.

3) To the beaker, add 5-6mL of the HCl.

4) Swirl, turn on the music and let chemistry happen.

**Results/Explanation/Teacher Notes:**

The following reaction will occur during this demo.

Na2S2O3(aq) + HCl(aq) 🡪 NaCl(aq) + H2O + SO2(aq) + S (colloidal sulfur)

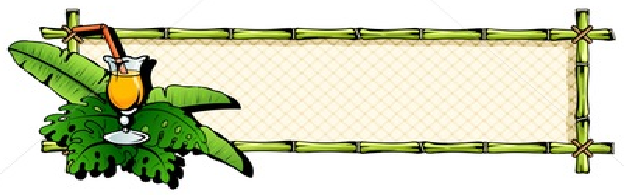
The purpose of this demo is to create colloidal sulfur. A colloid is formed when one substance is evenly suspended microscopically in another substance. In the case of this demo, solid sulfur is being suspended in the water. One characteristic of many colloids is the ability of the suspended particles to scatter light, an effect called the Tyndall effect. Colloidal sulfur has the ability to scatter short wavelength visible light (blue) while allowing long wavelength light (red) to pass through. So while this relatively slow reaction proceeds, colloidal sulfur starts to build up which causes the characteristic color change sequence as more and more light becomes scattered.

**References**

Chemical Sunset: Kitchen Table Demonstration <http://www.digitaldapp.org/demos/documents/chemicalsunset.pdf>

Red Sunset | Chemistry Demonstrations

<http://sites.jmu.edu/chemdemo/2011/06/14/red-sunset/>

**Introduction**

Sunset in a Beaker

It’s winter here in the Great White North. The days are short and often it is dark when you leave the house in the morning and dark when you get back at night. Snow greets us many mornings having buried our cars and covered the driveways. We bundled up to battle the snow and slush and pretend we actually like the wintery cold when we go skiing.

Since it is Friday, I propose we take a trip in chemistry class today to the Tropical Islands. Sit back, relax. Picture yourself sitting on a warm, tropical beach…a nice breeze blowing through the palm trees around you…a fruity drink in a coconut sitting next to you. So let the music fill you and let’s watch a gorgeous Caribbean sunset together.

**Observations**- Use the space below to write down your observations.

**Follow-up Questions**

1) What is a colloidal suspension?

2) What causes the different colors to be produced?

3) How is this reaction similar to a natural sunset?

4) What other compounds might produce a similar reaction?